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STEP

AUTHOR:

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TITLE:

Influence of an external axial magnetic field upon the elementary domains in a uniaxial ferromagneticum

PERIODICAL:

Acta Physica Polonica, v. 22, Supplement, 1962, 127-142

TEXT: The influence of an external axial magnetic field  $\kappa$  upon the magnetic structure of a uniaxial ferromagnetic single crystal is investigated according to a quantum theoretical calculation method of the author (see Acta phys. Polon., 21, 175 (1962)). This method is based on minimizing the energy mean value

$$h = Q_1 + Q_2 \int \left\{ \dot{\varphi}^2 - \kappa^2 \cos^2 \varphi + q \cos \varphi \right\} dv \quad (10)$$

of a certain class of quantum states. Here  $\varphi$  denotes the angle of a rotation  $U$  by which the Hamiltonian  $H$  is transformed.  $\varphi$  is the solution of the equation of minimization

$$2\kappa^{-2} \ddot{\varphi} = \sin 2\varphi - q \sin \varphi: \quad (12)$$

$$\cos \varphi = (1 - \omega \operatorname{sn} t) / (\omega - \operatorname{sn} t). \quad (13)$$

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$\omega$  is determined by the boundary conditions, which do not take into account the influence of the boundary domains of the single crystal. It is shown that an external magnetic field causes prevailingly a displacement of the Bloch walls in the interior of the crystal. The magnetization curve derived shows satisfactorily the well-known process of saturation. There are 6 figures.

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